

CLAIMS

1. A fabrication process for an optical microsystem
with monolithic electronic matrix, wherein N dot
5 matrix arrays (RM) and circuits associated with
each array are fabricated collectively, on the
front of a semiconductor wafer of a thickness of
at least around one hundred or several hundred
microns, in order to produce on this wafer N
10 identical monolithic electronic chips (10), with,
on at least one side of each array (RM), a set of
electrical contact lands (CC) for connecting the
corresponding chip externally, a plate for
collectively forming N identical optical image-
15 forming structures is fabricated collectively and
placed in close contact with the front of the
semiconductor wafer, each optical image-forming
structure (12) covering a respective chip (10) and
being designed to form an overall image
20 corresponding with the whole of the matrix array
of the respective chip, holes (32) through to the
contact lands (CC) on the front are opened at the
back of the semiconductor wafer and through its
thickness, these holes are used to establish a
25 conductive electrical connection with the contact
lands from the back of the wafer, and, only after
these various operations, the wafer is divided
into N individual optical microsystems, the
separation between the chips and the separation
30 between the optical structures covering the chips
being carried out along the same cutting lines
(HH, VV).
2. The process as claimed in claim 1, characterized
35 in that it comprises the formation of a sealing
bead (26) around each chip for bonding the chip
with the optical image-forming structure, this
bead being deposited in rows and columns at the
collective fabrication stage, on the semiconductor

5 wafer or on the plate intended to form the optical structures, and in that, at the end of the collective fabrication steps on the wafer, the wafer and the plate are cut along rows and columns extending in the direction of the sealing beads, centered widthwise along the latter.

10 3. The process as claimed in one of claims 1 or 2, intended for the fabrication of a liquid crystal microdisplay, liquid crystal being contained in a cavity formed between the chip and the plate intended to form the optical structures, characterized in that a filling hole (34) is made, for each chip, through the thickness of the
15 semiconductor wafer, and in that the filling is carried out and a plug is formed in the hole after filling, before carrying out separation of the wafer and of the plate into individual microsystems.

20 4. An optical microsystem, characterized in that it comprises the close association of a monolithic electronic chip of a thickness of one or more hundred microns, bearing on its front a dot matrix
25 array (RM) and electrical contact lands (CC), and of an optical structure for forming an overall image corresponding to the array, the structure being placed against the front of the chip, with electrical contacts (30) on the back of the chip
30 and conductive vias (32) between these electrical contacts on the back and the contact lands on the front, for access to the matrix array.

35 5. The microsystem as claimed in claim 4, forming a liquid crystal microdisplay and using as associated optical structure a cavity filled with liquid crystal and sealed by a plate (12) comprising a back electrode, the liquid crystal being situated between the chip and this plate,

the chip further comprising a hole (34) for filling the cavity from the back of the chip, extending from the back to the front of the chip, this hole being sealed by a plug (36).